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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,702	11/19/2003	Igor Shen Djokovic	AKTINO.0004P	8872

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EXAMINER	
TRAN, KHANH C	
ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/717,702	DJOKOVIC ET AL.	
	Examiner	Art Unit	
	Khanh Tran	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-7 and 22-28* is/are allowed.

6)☒ Claim(s) *8,9,11-15,18,20,21,29,31 and 33-35* is/are rejected.

7)☒ Claim(s) *10,16,17,19,30 and 32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11/29/2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 8-9, 11-15, 18, 20-21, 29, 31 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadous U.S. Patent Application Publication No. US 2003/0189999 A1.

Regarding claim 8, referring to FIG. 6, in paragraph [0138], Kadous teaches a receiver unit 600 including a RX MIMO/data processor 160a that performs successive interference cancellation (SIC) on the receiving transmission symbol streams.

In paragraph [0142], Kadous teaches that for the first stage 610a, spatial processor 620a receives and process N_R received symbol streams from RX OFDM processor 158. One of the detected symbol streams is then selected to provide to RX data processor 630a. Processor 630a further processes (e.g., demodulates, deinterleaves, and decodes) this symbol stream to provide a corresponding decoded data stream, which is an estimate of the transmitted data stream corresponding to the symbol stream being recovered. In paragraph [0143], Kadous teaches that for the first stage 610a, interference canceller 640a receives the decoded data stream from RX data processor 630a and performs the processing (e.g., encoding, interleaving, and

symbol mapping) to derive a remodulated symbol stream, which is an estimate of the symbol stream just recovered. The remodulated symbol stream is further processed in the time or frequency domain to derive estimates of the interference components. IN light of the foregoing disclosure, the decoded data stream corresponds to the claimed first signal and the estimates of the interference components correspond to the claimed cancellation signal.

In paragraph [0143], Kadous teaches the interference components are then subtracted from the first stage's input symbol streams y^1 to derive N_R modified symbol streams (denoted as a vector y^2), which include all but the subtracted (i.e., cancelled) interference components. Referring to FIG. 6, one of the modified symbol streams is selected and further processed by RX data processor 630b to generate decoded data stream 2.

Kadous, however, does not disclose the step storing at least one of the two or more signals in a memory and retrieving from memory as set forth in the application.

Because interference canceller 640a subtracts interference components from the first stage's input symbol streams y^1 to derive N_R modified symbol streams, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify Kadous teachings to store symbol streams y^1 into memory and retrieve from memory symbol streams y^1 for later processing by the interference canceller 640a.

Regarding claim 9, the receiving transmission symbol streams as recited in claim 8 rejection are encoded symbols.

Regarding claim 11, Kadous does not disclose decoded data stream 1 being stored in memory as set forth in the application claim.

However, as shown in FIG. 1, because decoded data stream 1 is outputted to data sink 164, one of ordinary skill in the art at the time the invention was made would have recognized that decoded data stream 1 is stored in the data sink 164.

Regarding claim 12, decoded data stream 1 represents transmission-encoded symbols.

Regarding claim 13, in paragraph [0010], Kadous techniques are provided to process a number of received symbol streams in a MIMO system with multipath channels such that improved performance may be achieved when using successive interference cancellation (SIC) receiver processing. Referring FIG. 6, decoded data stream 1 is decoded before decoded data stream 2.

Regarding claim 14, claim is rejected on the same ground as for claim 8 because of similar scope. Furthermore, stages 610a ... 610t corresponds to the claimed noise cancellation system, interference canceller corresponds to the claimed junction and RX data processor (see FIG. 6) correspondents to the claimed decoder.

Regarding claim 15, RX data processors 630a ... 630t (see FIG. 6) correspondent to the claimed decoders.

Regarding claim 18, in paragraph [0026], Kadous teaches that each data stream is independently processed (e.g., coded, interleaved, and symbol mapped) at the transmitter and may thus be independently recovered at the receiver. And in paragraph [0104], Kadous shows the performance of various SIC processing schemes, e.g. performance is provided for a (2,4) MIMO system with two transmit antennas and four receive antennas, and which uses 16-QAM with rate [fraction (1/2)] Turbo coding.

Regarding claim 20, referring to FIG. 6, RX data processor 630 is configured to provide decoded signal to stages 610.

Regarding claim 21, as recited in claim 13 rejection, Kadous techniques are provided to process a number of received symbol streams in a MIMO system with multipath channels such that improved performance may be achieved when using successive interference cancellation (SIC) receiver processing; see also FIG. 6. According to SIC processing, stages 610a ... 610t receive interference components from previous decoded channel.

Regarding claim 29, claim is rejected on the same ground as for claim 8 because of similar scope.

Regarding claim 31, claim is rejected on the same ground as for claim 9 because of similar scope.

Regarding claim 33, claim is rejected on the same ground as for claim 11 because of similar scope.

Regarding claim 34, as recited in claim 21 rejection, Kadous techniques are provided to process a number of received symbol streams in a MIMO system with multipath channels such that improved performance may be achieved when using successive interference cancellation (SIC) receiver processing; see also FIG. 6. According to SIC processing, stages 610a ... 610t receive interference components from previous decoded channel.

Regarding claim 35, claim is rejected on the same ground as for claim 13 because of similar scope.

Allowable Subject Matter

2. Claims 1-7 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 1, claim is allowable over prior art of record because the cited references cannot teach or suggest a method for filtering encoded signals as set forth in the application claim.

3. Claims 10, 16-17, 19, 30 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. Claims 22-28 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 22, claim is allowable over prior art of record because the cited references cannot teach or suggest a multiple input, multiple output system as set forth in the application claim.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Van Heeswyk et al. U.S. Patent 6,298,050 B1 discloses "System and method for cancelling the extra interference created during position location in a CDMA cellular system".

Walton et al. U.S. Patent 7,020,110 B2 discloses "Resource allocation for MIMO-OFDM communication systems".

Paulraj et al. U.S. Patent 6,351,499 B1 discloses "Method and wireless systems using multiple antennas and adaptive control for maximizing a communication parameter".

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KCT

Khanh Cong Tran

06/08/2007

Primary Examiner Khanh C. Tran